**Experimental and Estimated Rate Constants for the Reactions of Hydroxyl Radicals** with Several Halocarbons

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## **Abstract**

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Relative rate experiments are used to measure rate constants and temperature dependencies of the reactions of Ol 1 with (31~1' (41), CH<sub>2</sub>FCl (3-1), CH<sub>2</sub>BrCl (30B-1), CH<sub>2</sub>Br<sub>2</sub> (30112), CHBr<sub>3</sub> (20B3), CF<sub>2</sub>BrCHFCl (123aB1α), and CF<sub>2</sub>ClCHCl<sub>2</sub> (1 22). Rate constants for additional compounds of these types are estimated using an empirical rate constant estimation method which is based on measured rate constants for a wide range of halocarbons. The experimental data are combined with the estimated and previously reported rate constants to illustrate the effects of F, Cl, and Br substitution on 011 rate constants for a series of 19 halomethanes and 25 haloethanes. Application of the estimation technique is further illustrated for some higher hydrofluorocarbons (1 IFCs), including C1'~(311'CI lFCF2CF3 (111'2,CI'2C172CI'21 1 (338pcc), (43-10mee), CF3CH5CH5CF3 (356ffa), CF3CH2CF2CH2CF3 (458mfcf), CF<sub>3</sub>Cl<sub>12</sub>Cl<sub>1</sub>F<sub>2</sub> (245fa), and CF<sub>3</sub>Cl<sub>12</sub> CF<sub>2</sub>Cl<sub>13</sub> (365mfc). The predictions arc compared with literature data for these compounds. This research was carried out by the Jet Propulsion Laboratory, California Institute of Technology, under contract with the National Aeronautics and Space Administration.